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Comments:

From the SCS Chief

Targeting SCS Technical Assistance

The Soil Conservation Service is zeroing in on the most critical resource problems that face American agriculture. We are going after the most serious soil erosion, water conservation, and upland flooding problems first, and we are targeting more funds and people to the effort.

Erosion control will be focused not only on areas with high rates of soil erosion, but also on areas where even moderate erosion rates endanger productivity because of thin topsoil or other factors.

Although targeting has been applied on a limited scale so far, it already is resulting in improved resource protection. In fiscal year 1982, the program's first full year, about 35 percent more soil was saved than the year before—3.5 million tons—on the 48 million acres of cropland in erosion-targeted areas. In the arid West, irrigation farmers in targeted areas effected a savings in water used of about 130,000 acre feet.

In fiscal year 1983, SCS funds for targeting will reach \$12.5 million, an increase of nearly \$6 million over fiscal year 1982. Sixteen more States will have targeted areas in 1983, and we plan to increase targeting in still more States in 1984.

The Agricultural Stabilization and Conservation Service has joined SCS by targeting cost-sharing funds in the Agricultural Conservation Program to SCS-designated areas. The two agencies will work together in selecting areas to receive extra technical and financial assistance in 1984.



Cover: Erosion on soybean land in Pittsylvania County, Va. Pittsylvania is the largest of the 27 Virginia and North Carolina counties where the Soil Conservation Service is targeting its technical assistance to reduce soil erosion on cropland. (See Chief's Comments and article beginning on page 3.) (Photo, Tim McCabe, visual information specialist, Public Information, SCS, Washington, D.C.)

John R. Block
Secretary of Agriculture

Peter C. Myers, Chief
Soil Conservation Service

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USDA Takes Aim at Erosion on Southern Piedmont Cropland

by Donald L. Comis



Photo by Tim McCabe

Last spring, unusually heavy rains washed thousands of tons of soil off fields in the rolling southern Piedmont of North Carolina and Virginia. Scientists who are monitoring storm runoff from two farms in North Carolina say one storm washed 17 tons of sediment off an 18-acre field of continuous soybeans—typical of many cropland acres not protected by conservation practices.

Considering that the clayey subsoil has already been exposed from beneath the eroded shallow plow layer in many areas, farmers may be wondering how many more rainy springs they can survive without conservation practices.

The storms highlighted the serious cropland erosion in this area, which ranges from 10 to 46 tons of topsoil per acre each year. Because of these high erosion rates, the Soil Conservation Service, working through soil and water conservation districts, plans to target conservation technical assistance to the area beginning this year.

The area covers 14 Virginia counties and 13 North Carolina counties, fanning out from the Blue Ridge Mountains northeast almost to Richmond, Va., and southeast almost to Raleigh, N.C., and stopping at the Atlantic coastal plain. It was named the Piedmont Bright Leaf Erosion Control Area after the bright leaf tobacco variety grown there.

But the colorful name could be misleading—although tobacco is king in both States, with cigarette tobacco accounting for about 80 percent of the cash receipts from crops sold in the Bright Leaf area, the area's 129,185 tobacco acres are dwarfed by the 579,116 acres of corn, soybeans, and small grains. These crops account for more of the total erosion problem than tobacco does, simply because they are grown on so much more land.

SCS specialists know the causes and solutions to the erosion problem in the Bright Leaf area, so their task is to get the solutions onto the land, through a combination of more personnel and new ways to reach farmers and landowners.

Each State gets \$350,000 this year to hire one soil scientist, and additional

soil conservationists, conservation technicians, and part-time aides.

Last spring's storms may make the tremendous selling job required by the targeting efforts this winter a little easier. But the challenge is still a big one: selling conservation to farmers and landowners SCS has never reached before, at a time when farmers are debt ridden and short of cash. Since old ways have not worked with these farmers, SCS must find new ways to reach them.

The increased person-to-person contact with farmers that is the heart of the efforts will begin this year. One district conservationist has vowed he or his staff will visit every tobacco farmer in his two-county field office by next September.

SCS field personnel will knock on more doors than ever before, send letters to absentee landowners, and seek the help of farmers, including those who are not yet conservation district cooperators, and other community leaders from farm organizations, local government, soil and water conservation districts, schools, banks, private industry, and other sources. In Virginia, they will invite these leaders to form community action groups that will develop additional activities to promote conservation on cropland.

This spring, local soil and water conservation districts will host tours, led by SCS district conservationists, on fields belonging to innovative farmers. SCS will display signs on these roadside fields to direct attention to terraces, conservation tillage, or other practices they are encouraging.

All of the SCS district conservationists either have met or will meet with heads of other USDA agencies in their counties to make the targeting efforts a model of inter-agency cooperation.

Exemplifying the cooperation encouraged by targeting efforts, Bobby Whitescarver, an SCS soil conservationist, coordinates Bright Leaf activities in Virginia jointly with Keith Planter, an Extension Service leader for program development. Together they will promote conservation tillage and other erosion-stopping practices on cropland in Virginia. North Carolina has hired an

agronomist to work exclusively in the target area.

Both States' SCS district conservationists in the target area are meeting this winter to review their States' information plan, which was developed with the help of the information staff from the SCS South National Technical Center in Fort Worth, Tex. The plans call for joint press releases, a newsletter, displays, posters in country stores and urban shopping malls, and slide shows. A logo printed on stationery, literature, hats, and T-shirts will identify Bright Leaf activities.

Many local newspapers announced the beginning of the targeting efforts this fall. More articles, radio and television announcements, brochures, and flyers will continue to publicize the efforts.

This January, Virginia will publish the first issue of a quarterly newsletter for the entire Bright Leaf area, alternating with North Carolina for future issues. The newsletters will discuss progress in controlling erosion in the area and share information about successful ideas with all conservation districts.

SCS specialists know erosion in this area is caused by growing crops—especially tobacco and soybeans—without established conservation practices. Whitescarver says the way these two crops are currently grown leaves the soil very vulnerable to erosion. The specialists know the conservation practices that will control erosion on cropland, but they have to penetrate a layer of excuses to convince a farmer to try them. When farmers are financially pressed, they use that as the main reason they cannot try conservation practices. "The problem with putting conservation on the back burner when times are hard, is that times are always hard for farmers," says Whitescarver.

The SCS solution to this obstacle is to suggest relatively inexpensive practices, such as stripcropping and crop rotation. For example, they recommend that tobacco farmers use either a 3-year rotation, resting the soil with 2 years of fescue, or a system with 2 years of tobacco and 2 years of small grain and fescue.

Conservation tillage is a major, low-cost way for farmers of most crops to slow erosion. Whitescarver has looked at research with no-till tobacco in North Carolina and Virginia and says it looks very promising, but more research is needed for it to become a practical solution for tobacco farmers.

Bright Leaf farmers have used the same machine-shop ingenuity as farmers everywhere to build their own conservation tillage equipment and lower their costs even further. Many districts are considering buying no-till planters which could be used for planting corn, soybeans, and small grains, in addition to renovating pastureland.

Knowing 1-year leases hinder conservation, SCS plans to teach landowners the benefits of long-term leases that give tenant farmers the guarantee they need to invest in costly practices to protect rented land.

SCS will do everything it can to make conservation more affordable while helping to develop the cost-benefit figures to show farmers exactly how affordable it already is in the Bright Leaf area. In addition to helping farmers get long-term leases and suggesting low-cost conservation practices, SCS will encourage local initiatives such as seed co-ops that lower the seed costs for winter cover crops.

USDA's Agricultural Stabilization and Conservation Service (ASCS) will provide substantial additional Agricultural Conservation Program (ACP) cost-sharing funds to all targeted counties this year (\$19 million nationwide), a step that farmers say is crucial to the success of these efforts.

A year ago, ASCS began a special ACP project in the Flat Rock Creek watershed in Lunenburg County in Virginia's target area. This project brought conservation practices to some farms for the first time, such as one owned by Tryon Nevins, who has already begun stripcropping and has built six grassed waterways and a pond. Nevins' example inspired a neighbor to build grassed waterways, too, without any cost sharing but with SCS technical assistance.

Once SCS gets past the difficult first step of getting a farmer to forget all excuses and try a practice such as crop rotation, the successful results make it easier to persuade the farmer to go further toward controlling erosion. For example, many farmers have seen that resting tobacco land for 2 years with fescue breaks the cycle of nematodes, black shank disease, and other pests. They have seen it enriches the soil and makes it more workable, making tobacco growing easier. It also saves them the costs of at least one irrigation every year, by leaving fescue root clumps from the previous crop in the soil to act as tiny sponges, soaking up water for the tobacco plants. That's worth at least \$20 an acre to tobacco farmers each year.

Ultimately, farmers realize that what SCS is offering are good, practical management tips which long-time cooperators say helped them survive in the business of farming.

William Vaughan is an 88-year-old retired farmer in Charlotte County, Va., who has seen the benefits of conservation applied on his land by the Civilian Conservation Corps, the Soil Erosion Service, and its successor, SCS. He has spent decades saving soil and getting others to save soil, including 26 years as a Southside Soil and Water Conservation District (SWCD) board member, serving as a board chairman for many of those years.

Vaughan wishes he had more time to finish his work, but he says things are better now and younger farmers are more willing to listen to new conservation ideas than his generation was.

"But if this county hadn't turned around from what it was in 1916 to 1920, we'd have been the Badlands of South Dakota by now; we'd have been nothing but gulches," Vaughan says. Vaughan points to his great-grandnephew running around the living room of his Civil War-era home and says proudly that the boy is "the fifth generation that has been here, and we haven't ruined the land yet."

Vaughan is typical of the Bright Leaf area farmers who believe they do not own the land, but are just stewards of it

for future generations. Rufus Huff, Granville Soil and Water Conservation District supervisor in North Carolina, says it this way: "We don't own the land; we're just holding the title. It belongs to the next generation. I've got one granddaughter, 3 years old, and I've already willed her a little piece of land." The land has been in their families a long time and as one young farmer said, "I'd hate to see it get out of the family."

They are proud of their families, of farming, of their counties, and of their

country. The economy and erosion cause them to fear their children will not be able to farm their land and that the Nation will no longer be able to feed itself.

It is these land lovers who take their responsibilities so seriously and are respected community leaders that SCS will rely on to persuade their neighbors that conservation is something to be proud of.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.



SCS District Conservationist Ralph Williamson (left) shows farmer Ward Finney a booklet that explains plans for the Bright Leaf area. Finney and his brother own 355 acres in Franklin County, Va. Finney grew 17 acres of flue-cured tobacco and 2 acres of dark-cured tobacco last year. He and his brother also have a cow-calf operation and grow small grain, wheat, and corn to feed the cattle.



North Carolina Extension specialists sample storm runoff as it passes through this flume, from an 18-acre field of continuous soybeans, grown up and down hills. Sediment in the foreground washed off the field, which is a control site being compared with another 18-acre field on a nearby well-managed farm.

Rain Brings Disaster to California

by Richard J. Casale
and Nancy M. Garlitz

Up to 24 inches of rain fell on much of central California in early January 1982. Soaking the land beyond capacity and running off into already full channels, the water caused flooding, landslides, and extensive soil erosion.

Santa Cruz County was especially hard hit. On Monday, January 4, the weather forecast had called only for a chance of showers but more than 20 inches of rain fell in less than 30 hours. When the rain started falling, no one knew it would become one of the worst natural disasters to hit the county in this century.

Around 11 a.m., Monday, came the first sign of what was to become a 100-year storm. A Santa Cruz police officer reported that the San Lorenzo River had overflowed its banks and was headed toward the county building. Soquel Creek also began to overflow, flooding a mobile home park.

At 1:30 p.m., the Santa Cruz sheriff notified State officials in Sacramento that the county was adopting emergency procedures. About 2 hours later, the schools closed. It was raining hard with no relief in sight. The late afternoon brought reports of landslides on county highways and major county roads. It was no ordinary storm.

By 8 p.m., debris clogged almost all the county's creeks destroying stream channels and forcing the creeks to overflow. Hillsides continued to slide throughout the night. Water and mud closed major highways and more than 40 county roads.

By the end of the day, the county had received some 3,500 emergency calls. From the San Lorenzo Valley to Aptos, people began to flee their homes. Shortly after 1 a.m. on Tuesday, one lane of the Soquel Avenue bridge collapsed into the raging San Lorenzo River.

At 2 p.m., survivors of the tragic Love Creek slide in Ben Lomond made their way out to tell their story. An entire mountainside had given way without warning, destroying 12 houses and claiming 10 lives, two of them children. Geologists say the Love Creek slide is one of the largest to occur on the North American continent in this century.

A man who lives near the slide, Eric Schwarzbach, says that he doesn't know just when the hillside gave way, but close to midnight on Monday he and his wife heard something that they thought was thunder or a big plane flying over.

Schwarzbach says it didn't seem to last more than a minute, but the windows rattled and the house shook. Through the early morning hours he says that he and his wife watched nearby redwood trees fall and listened to rocks roll down the hill, some hitting their house.

"We didn't know about the Love Creek slide until 6:30 a.m.," says Schwarzbach. "When I got there, I didn't know where I was. I didn't even recognize the area."

The slide carried trees, houses, cars, trucks, soil, and rocks into Love Creek where a 20-foot-deep lake formed behind the mass, flooding houses upstream and threatening more than 30 houses downstream.

"This was a really nice little community," says Schwarzbach. "The people who lived here held an annual chicken barbecue, had formed a road association, and were involved in other neighborhood projects."

Now, a year later, a neighborhood watch group tries to keep vandals and

sightseers from poking around in the rubble which still litters the hillside. It is a scene of mangled appliances and car bodies, broken dishes, a gym bag, bits of Christmas decorations, and more.

Most of the houses along Love Creek were built in the 1920's and 1930's as summer cottages but have since become year-round homes. Geological studies show that the potential for future sliding exists in some areas around Love Creek and heavy rainfall this winter could cause more problems. Because of this, Santa Cruz County officials have given 28 homeowners in the area until July 1983 to either destroy their houses or move them out.

The county has offered homeowners county land on which to relocate if they decide to move their houses. Schwarzbach, who is a real estate broker, says the county action is being done to prevent more loss of life but is causing much heartache and financial strain for the affected homeowners.

No one knew the extent of the damage in the county until several days following the storm. Massive sliding and flooding closed roads and cut power to the Lompico area, isolating more than 2,500 people from emergency aid. Many areas, including the county government center

A January 1982 rain-storm turned quiet streams in Santa Cruz County, Calif., into liquid paths of destruction.



Photo by Jeff Hill,
Ben Lomond, Calif.

in Santa Cruz, had no power from several days to several weeks.

County officials estimate the dollar loss from the storm at more than \$300 million with more than 150 houses completely lost, and as many as 500 severely damaged. Twenty-two people lost their lives in the storm in Santa Cruz County and more than 10,000 others suffered some sort of personal or property loss.

Even though their office in Soquel was under 9 inches of water and mud, the Santa Cruz County Resource Conservation District (RCD) and the Soil Conservation Service responded quickly to the flood of requests for assistance in repairing storm-damaged land. Emergency teams of RCD and SCS employees and RCD directors made more than 300 onsite visits to landowners in the first 4 weeks after the storm.

The teams assisted landowners with landsliding problems, gullying, stream-bank erosion, and other storm-related problems. The teams left a written summary of their recommendations with the people they visited. The RCD and SCS also developed more than a dozen "how-to" guides and fact sheets to help people to help themselves. The president of the RCD, Ward Hastings, worked with the emergency teams on many visits and one

RCD director, Roberta Smith-Evernden, who is a registered geologist, spent 1 day a week for 6 weeks helping landowners who needed to consult a geologist.

SCS and the RCD also worked with the Federal Emergency Management Agency, which set up a command center in Santa Cruz to coordinate the efforts of Federal, State, and local agencies. Under the Emergency Watershed Protection (EWP) program authorized by Section 403 of the Agricultural Credit Act of 1978, SCS approved emergency funding for 16 projects, four of which were declared exigencies because they threatened further loss of life and property. One of these was Love Creek.

However, no one could begin clearing the Love Creek channel until the search for bodies, which took about 2 weeks, was completed. As soon as the damage at Love Creek could be evaluated, SCS approved EWP funds for the clean-up project, and work began almost immediately.

SCS provided technical assistance with clearing the Love Creek channel where the landslide had not only deposited huge amounts of dirt and rocks but had also formed a massive log jam. SCS also assisted with shaping, stabilizing, and revegetating the streambanks.

SCS provided similar assistance throughout Santa Cruz County. All four exigency projects, for which SCS provided \$226,000 in EWP funds, were completed by early March and functioned well throughout the rest of the rainy season.

Repair work is expected to go on for years because hundreds of log jams still block major drainage channels, and thousands of cubic yards of sediment cover the land, houses, roads, fill culverts, waterways, and drains. SCS and RCD staff have met with more than 700 people onsite to assist with storm-related problems since January 4, 1982, and still meet with about 30 others every month.

With assistance from SCS, the RCD, and other Federal, State, and local agencies, residents of Santa Cruz County are stabilizing slopes and installing drainage systems to safely carry water downhill.

The sound of falling rain has taken on new meaning for people in Santa Cruz County, but they are taking steps to prevent or at least reduce the chances of such a disaster striking again.

Richard J. Casale,
district conservationist, SCS, Soquel, Calif.

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*, SCS, Washington, D.C.



At left, nearly a year later, debris and household items of the people who died in the tragic Love Creek slide still litter the hillside above the creek. At right, Love Creek has been cleared of debris and its banks shaped, stabilized, and vegetated with SCS assistance.



Photos by June Davidek.

Morris Run and RAMP Revisited

More than a year ago, a small Pennsylvania coal town received considerable publicity over dramatic changes in the landscape created through the Rural Abandoned Mine Program (RAMP). (Under RAMP, the Soil Conservation Service, through soil and water conservation districts, helps rural land users develop and carry out plans to reclaim abandoned mined land.)

Before and after photographs of Morris Run illustrated the conversion of eroding mine culm (spoil) banks and abandoned coal company buildings to a green hillside. They showed what could be accomplished through RAMP. The pictures appeared in newspapers, exhibits, and on television over a wide area.

A visit to Morris Run today shows it to be a rural Appalachian village. All the streets in town are dirt except the State highway which curves through town. The post office has a new coat of paint and one new home has been built to replace one which burned. However, several other houses are vacant, as is the coal company store which has a "for sale" sign in the window. That is the first reaction as one drives into town; except for the two RAMP projects, nothing has changed in Morris Run.

If you talk to people in town, however, you soon realize that things are happening.

Merv Harbold, township supervisor and owner of the only tavern in town, said people are working together more now and want to see an improvement. He pointed out that the street from the one RAMP site to the State highway has been rebuilt.

"We'd like to do more," said Harbold. "We're a low income area. Our tax rate is only 2½ mills. We may need to double that so we can begin paving streets, but it is tough. Many of our residents are retired miners and we don't want to create financial problems."

Harbold explained that the local 4-H Club, the Morris Runners, graded and seeded the land next to the borough garage. On the plot, they erected a sign identifying the village as Morris Run for the 150th anniversary of the town's founding.

Postmaster Gary Mahonski serves as chairman of the recreation committee which is planning a playground on one RAMP site. In this project, an eroding culm bank was stabilized by creating level terraces supported with log cribbing.

"We have raised money for the play-

ground," said Mahonski, "but much of the material will be donated." Interpace Foundry is providing, and Jones and Brague Coal Company is erecting, the steel posts for basketball and tennis courts. The Jones Foundation is providing the paving, and two area sawmills offered to provide the lumber for playground equipment.

A new nursing home started in Morris Run prior to the RAMP work. However, owner Homer Strong said that it made him, as a new businessman, "feel good to see those abandoned mines changed to green fields. It makes the town look more sanitary." He is now expanding from an 8-bed to a 15-bed nursing home.

Earl Lamberson, retired miner and member of the water authority, declared that former residents are surprised at the improved appearance of the area. Mahonski agreed, "Anything was an improvement. They recycle everything else, why not land!"

Township Supervisor Harbold emphasized, "RAMP is a good use of money and people should realize that this is coal company money, not tax money, that is paying the bill."

This isn't the end of the story for Morris Run. As the residents celebrated their



An unsightly and hazardous abandoned mine site (above) is transformed through the Rural Abandoned Mine Program (above right).

Photos by Tim McCabe

Resource Conservation in Kansas City

150th birthday, SCS District Conservationist Don Lindsey reported that the bulldozers and other equipment were working on another RAMP contract reclaiming a 25-acre abandoned mine site on the northeast edge of town.

"This still leaves an open shaft, more mine spoil, a highwall, and some mine subsidence for future reclamation," added Lindsey. "When this is finished, the 150 families of Morris Run will be able to enjoy a safer and healthier environment."

Frederick E. Bubb,
public affairs specialist, SCS, Harrisburg, Pa.

Eight States Receive Mined Land Reclamation Funds

Eight States received funds totalling \$13,251,000 to help people reclaim non-Federal land damaged by coal mining. The funds are from supplemental appropriations provided under the Rural Abandoned Mine Program (RAMP) administered by the Secretary of Agriculture.

Congress authorized RAMP in the Surface Mining Control and Reclamation Act of 1977. The purpose was to provide individuals with cost sharing and technical assistance in their efforts to reclaim non-Federal land disturbed by coal mining operations.

Coal mining States to receive the funds, and the amounts, are: Alabama, \$135,000; Iowa, \$1,963,000; Kentucky, \$1,611,000; Ohio, \$1,570,000; Oklahoma, \$985,000; Pennsylvania, \$4,254,000; West Virginia, \$2,664,000; and Wyoming, \$69,000.

The funds will finance more than 45 high priority reclamation projects planned by USDA's Soil Conservation Service. The Federal Government's share of reclamation ranges from 25 to 100 percent, depending on the acreage to be reclaimed, the proposed use, and whether the benefits are mostly private or public. Each landowner may receive funds for reclaiming up to 320 acres. The reclamation contracts cover a 5- to 10-year period.

The Mid-America Association of Conservation Districts (MAACD), an eight-county coalition of districts in the Kansas City, Mo., and Kansas City, Kans., area, has undertaken many resource conservation projects over the years. MAACD representatives work with local elected officials, developers, planners, engineers— anyone interested in urban resource conservation.

One project MAACD became involved in was started by the Independence Neighborhood Councils of Independence, Mo. Concerned about flooding, the councils decided to undertake "Project Water Ways," to clear streams and other waterways of debris inhibiting stream flow.

"Individuals and organizations were more than willing to help," said Steve Zahner, project facilitator. "Since the September 1977 flood, people in Independence know firsthand what water can do."

Forty-two neighborhoods working through 20 citywide committees prepared survey reports on stream blockage. MAACD helped coordinate the massive inventory process. Aerial maps provided by the Soil Conservation Service and a survey form aided citizens in charting various obstructions, unsightly areas, and potential flooding problems. The survey reports prompted the city to establish a work program for \$80,000.

City cleanup crews began working on city property and areas accessible through rights-of-way. They began upstream and worked their way downstream so that in the event of a heavy rainstorm, debris floating downstream wouldn't clog sections already cleared. As easements are obtained, the cleanup crews will work on private properties. After Independence received 14 inches of rain in 7 hours last August, the city added a second crew to keep the waterways clear.

The Independence Neighborhood Councils have a motto: "You don't have to move to live in a better neighborhood." MAACD says that the first step to a better neighborhood is a better environment.

Another project originated when MAACD asked park and recreation directors in the region if they ever had erosion

and runoff problems on existing or developing public open-space land. All the directors said "Yes."

Roscoe Righter, parks director from Blue Springs, Mo., and chairman of the Parks, Resources, and Municipal section of the Missouri Parks and Recreation Association, recommended that MAACD and SCS conduct a course on erosion control for area park maintenance workers at their annual association meeting.

"The key to getting a good urban erosion control program in public areas is beginning with well-trained, properly informed maintenance personnel," Righter said. "You must educate the people who work with the resource problems every day."

MAACD, with help from SCS, designed an onsite workshop at a developing park. The workshop was designed so participants had to come up with solutions to existing and potential problems at eight sites in the park. The participants were to evaluate and recommend technical solutions based on their firsthand observations. In this way, the decisions reflected the participants' limitations in equipment, supplies, and staff.

Problems included critical area erosion, a dam with a spillway problem, and an area of dying grass. For one site where overland flow from the top of a hill was creating an erosion problem, the participants had to consult with an SCS engineer who recommended a diversion.

The workshop has become an annual event and has expanded to include park workers from the entire State.

According to Leon Lallier, MAACD chairman, urban public parklands are only one land use area needing special district resource training programs. MAACD is now planning annual short courses that will provide current information on urban erosion control and detention basin design. Planners, landscape architects, and engineers engaged in planning, design, and approval of developments will be invited to take the courses.

Robert J. Brejcha,
resource conservationist, SCS, Independence, Mo.

Irrigation Water Goes Underground on Texas Rice Land

by Dale D. Allen

Replacing open irrigation ditches with underground plastic pipe is greatly reducing pumping costs and water losses on the Texas gulf coast.

Use of the underground pipe, combined with land leveling, makes it possible for farmers to rotate rice and row crops with ease.

Harlen Nelson of El Campo, who farms nearly 2,000 acres, likes the underground pipes so well that he is even installing them on leased land.

"These pipelines will pay for themselves in 3 years in reduced pumping costs," Nelson said. "I've installed them on all the land I own and we are now putting them in on land that I lease. When I finish, I will have about 3½ miles."

At an average cost of about \$7 per linear foot, or some \$35,000 per mile, that's quite an investment.

"But look at the benefits," Nelson continued. "First, by leveling the land and using the plastic pipe, I can irrigate 20 percent more rice than before with the same amount of water."

"We have cut water losses by at least 30 percent," he estimated. "My labor input per acre has also decreased because all we have to do now is open a faucet and there's the water."

Before installing the pipelines, Nelson said he would sometimes have to pump water 24 hours down an open ditch before he could start irrigating a crop. It took that long for the water to soak up the ditch and fill all the holes and cracks—water that was totally wasted.

Harold M. Graf, Soil Conservation Service district conservationist at Wharton, and his staff give technical assistance to farmers through the local Wharton County Soil and Water Conservation District. They help farmers plan and install underground pipelines.

"Nelson now has 'instant water,'" Graf said. "And look at the land he has gained. His old irrigation ditches were at least 36 feet wide. That's about 5 acres per mile. By eliminating the ditches, he can now farm that land."

Land leveling also greatly reduces the number of levees needed to irrigate rice. One 80-acre field now has two straight

levees in it. Before leveling, Nelson said the field had 14 long, curving levees.

John A. Schmidt also uses land leveling and underground irrigation pipe on his farm in Wharton County. Schmidt has a 240-acre field where the underground pipe replaced open ditches.

"We gained 10.6 acres of land in this field when we put in the pipeline," Schmidt said. "Before we leveled this land, I couldn't grow row crops such as sorghum or soybeans in rotation with rice. The land leveling also eliminated the need for drainage ditches."

"We can water our land at a more uniform depth now," Schmidt continued. "Before it was leveled, we had low spots that never dried out."

This also allows rice to ripen more uniformly, making it easier to harvest.

Schmidt said that before the lines were installed, he had to run his irrigation pump 22 hours to put water into some of the fields.

"We had to spend hours checking for nutria holes in the ditches," he continued. "And they're difficult to find because the nutria dig their holes where the vegetation is the thickest and that's where the holes are hardest to see."

"But now, we turn on the pump and we have instant water in whatever field we want it," Schmidt farms about 1,600 acres of land.

Graf said personnel from his office have helped conservation district cooperators install 45 miles of under-

ground pipelines during the last 10 years. One of the earlier systems was put in on the Texas Agricultural Experiment Station farm west of El Campo.

In 1974, Long Term Agreements were worked out for the first time on two farms with cost-share assistance provided through the Agricultural Conservation Program administered by the Agricultural Stabilization and Conservation Service. Graf said this cost-share money helped prove the practicability of the pipelines. Although this financial assistance is no longer available on rice land, the practice is gaining popularity due to the energy and water conservation benefits.

Plastic pipelines are not easy to install. First, a ditch about 4½ feet deep is dug with a trencher. Then the pipeline goes in and is pressure tested to make certain that there are no leaks. While water pressure is maintained in the pipe, the ditch is partially filled with soil; water is added in the partially filled ditch to settle the soil. Next, more soil and more water are added until the ditch is filled.

Then comes the result—a reduction in pumping costs that will pay for the system in a few years—plus less water waste, reduced labor, and 5 more acres of land per mile of pipeline.

And instant irrigation water where and when you want it.

Dale D. Allen,
public affairs specialist, SCS, Temple, Tex.

Underground irrigation pipe and land leveling give Texas rice farmers instant water where and when they want it and help them save energy and water, reduce labor costs, and gain farmable acres.



CONSERVATION Research Roundup

Tracking Down Salt

At the U.S. Salinity Laboratory in Riverside, Calif., a U.S. Department of Agriculture Agricultural Research Service soil chemist, Dennis Corwin, is developing a computer model to predict where excess soil salinity is most likely to occur. Corwin says that if farmers know where potential problem sites are, they can manage the land to prevent the buildup of salts which can limit crop production.

Excess soil salinity occurs mainly in the arid West where irrigation water is often salty, and shallow water tables send salty water to the upper profile through capillary action. The water evaporates and leaves the salts behind to accumulate at or near the surface.

Too much salt reduces the ability of plants to take water from the soil, and once excess salts build up, the problem is difficult to correct. Water must be added to leach, or wash, out the salts, which can take months. Corwin is trying to determine the part each soil property and variable condition plays in building up salts in the soil profile.

Using the Soil Conservation Service soil survey of the Yuma-Wellton Area in Arizona and California, Corwin is building a data base of soil properties such as soil type, permeability, depth to water table, and electrical conductivity of ground water. He is dividing the soil survey maps into workable sections, or grid cells, which represent areas measuring 2,000 feet by 2,000 feet and assigning soil properties to each cell. He is storing the information on magnetic floppy disks.

Corwin is also storing information on variable conditions such as leaching fraction, application and quality of irrigation water, precipitation, evaporation, and transpiration. His goal is to develop a data base and mathematical model which can be used to make overlay maps to show potential areas of salinization under a given set of conditions.

"Now we are relying mainly on what we can observe in the field for detecting areas of high soil salinity," says Corwin. "But, by the time you can see the effects of salinization, corrective measures are

usually needed." On cropland, barren spots and stunted plant growth are common signs of too much salt.

When his computer model is completed, Corwin says that it will be used to pinpoint saline or potentially saline areas within a large irrigation basin. "Agencies like SCS can use this information to help farmers adopt land and irrigation management practices that can prevent or reduce the problems that too much salt in the soil can cause," says Corwin.

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

Crops Ignore Acid Rain

Acid rain may be wreaking havoc with fish and granite statues, but it won't do much harm to U.S. crops, judging by an Oregon State University (OSU) study of its effect on wheat, corn, alfalfa, tomatoes, lettuce, and more than a dozen other plants.

"Plants seem to ignore acid rain is the best way to put it," said Dale Moss, project director and head of OSU's crop science department.

"I wouldn't feel one bit spooky about saying our results suggest it doesn't have much impact on crops. We see some stimulation, some inhibition, but no big effect. Generally, by our results, it's just not a problem," added the project field research supervisor, Shelton Perrigan.

The work of Experiment Station researchers on the 3-year-old project is being funded by the U.S. Environmental Protection Agency.

Some studies elsewhere in the country seem to back up the OSU finding; others don't.

Acid rain, said to be falling with increasing frequency in some parts of the country, is formed when pollutants such as sulfur dioxide and nitrogen oxide combine with moisture in the atmosphere.

It has been fingered as the culprit in lakes where fish and all other life died, in polluted drinking water, and in the speeded up erosion of granite and marble structures in the Midwest and East.

The OSU study, which started as a broad look at how acid rain affects about 20 key crops, will narrow in focus to four experiments with field corn, the type fed to livestock.

Reprinted from the Spring/Summer 1982 issue of *Oregon's Agricultural Progress*, published by the Oregon Agricultural Experiment Station, Corvallis, Oreg.

The Acid Test for Fish

A team of scientists based in Edinburgh, Scotland, is a step nearer to solving an international problem currently decimating fish stocks in rivers and lakes in North America and Europe.

The scientists, from the Institute of Terrestrial Ecology, have found that coniferous trees such as spruce, fir, and pine actually concentrate the effect of "acid rain" and release lethal aluminum into the water.

"The effect," says Professor Fred Last, "is disastrous in that the high aluminum content kills off young fish soon after spawning, leaving in many cases a fish population consisting only of old fish with no young ones to replace them when they eventually die."

Professor Last and his team made the discovery while studying the distribution of pollutants in the atmosphere and their impact on the countryside. Sulphur dioxide and other chemicals released from the tall chimneys of power stations and smelters mingle with smoke from houses to form pollutants that can be carried for hundreds of kilometers.

"When these gases blow across forests," says Last, "acid particles cling to the leaves and trunks of the trees. When it rains or, even more seriously, snows, the acid in the air combines with the acid on the trees, reaching the soil in concentrations so high that aluminum is leached out of the ground and washed into the water."

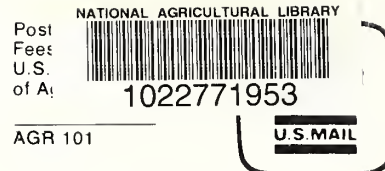
Reprinted from the June 1981 issue of *Soil & Water* published by the Ministry of Works and Development, Wellington, New Zealand.

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AgEvents

1983

March	20-26 21	National Wildlife Week National Agriculture Day
April	17-23 22	Keep America Beautiful Week National Arbor Day
May	4-5 8-15	International Land, Pasture, and Range Judging Contest Soil Stewardship Week
June	5	World Environment Day
September	24	National Hunting and Fishing Day
October	2-8 16	National 4-H Week World Food Day
November	18-24	National Farm City Week

New Publications

Remote Sensing for Resource Management

Edited by Chris J. Johannsen
and James L. Sanders

Material in this book is from papers presented at a national conference of the same name, held October 28-30, 1980, in Kansas City, Mo.

This book contains a number of how-to-do-it chapters to help people better understand the procedures and methodologies of remote sensing.

The book is divided into 10 sections beginning with a section on the state of the art, with chapters including some basics about remote sensing, overviews of resource applications, and specifics about geographic information systems. The next five sections detail remote

sensing applications across such resource areas as land, vegetation, soil, water, and coal resources. Applications by discipline area are given in the next three sections, including agriculture, industry, and public agencies. Each chapter is based on the authors' experiences in local, State, and national projects. The final section provides a look into the future of remote sensing. Appendixes include a list of sources for remote sensing products, the status of State-level natural resource information systems, a glossary of remote sensing terms, and a detailed acronym list to assist those who are not familiar with remote sensing technology.

The 665-page book is meant as a reference text for individuals dealing with resource inventory and management.

It is available from the Soil Conservation Society of America, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021, for \$45 (\$40 SCSA members), postpaid.

Handbook of Soils and Climate in Agriculture

Edited by Victor J. Kilmer

One of a series of handbooks in agriculture, this handbook presents reliable information in a condensed form on soil science and climate as it relates to crop production. The many tables and figures were compiled especially for this handbook by qualified, competent scientists who are recognized authorities in their respective fields of specialization.

Sections of the handbook cover U.S. climate; soil classifications, physics, chemistry, microbiology, and organic matter; soil fertility, fertilizers, and plant nutrition; fertilizer sources and composition; lime, lime materials, and other soil amendments; soil and water management and conservation; and wind erosion.

This handbook is available for \$59 from CRC Press, Inc., 2000 Corporate Blvd., N.W., Boca Raton, Fla. 33431.

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